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#5/Recons. mail 5/19/04

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Scott Wollenweber
USSN:	09/745,572
Filed:	December 21, 2000
Title:	IMAGING TABLE SAG MEASUREMENT AND COMPENSATION METHOD AND APPARATUS
Examiner:	Desire, Gregory M.
Art Unit:	2625
Docket:	390086.94596

Mail Stop AMENDMENT
Commissioner for Patents
PO Box 1450
Alexandria VA 22313-1450

Dear Sir:

In response to the Patent Office Action dated February 9, 2004, please consider the following comments amend the above application as follows.

RESPONSE TO OFFICE ACTION

Applicant notes that this response is being submitted on May 10, 2004 because May 9, 2004, the three month dead line, fell on a Sunday. Under the CFR, this response is being timely filed within the three month time period allotted for response without extension.

The following numbered paragraphs are provided to respond to the similarly numbered paragraphs in the Office Action (e.g., paragraph "1" below corresponds to paragraph 1 in the Office Action).

1-2. The Office Action rejected each of claims 1-9 and 11 –21 as obvious over Kosugi in view of Nutt. Applicant traverses this rejection as each of Kosugi and Nutt is different than the present invention in both form and function and each of the references in fact teaches away from the claimed invention.

The present invention has been developed to compensate for the fact that patient support tables having certain characteristics tend to bend or deflect when extended sufficiently to facilitate imaging. To this end, as described in the present specification, when a patient support table is extended for use with a dual imaging CT-PET system, some tables tend to deflect downward at distal ends or along their lengths when extended and the degree of bending often changes as the bed is extended and retracted to different degrees. Where a table bends, image data collected by adjacent CT and PET detecting systems is misaligned and an alignment process is required to generate diagnostically useful images.

The present invention solves the data alignment problem in a very simple manner by determining the amount of table bending or deflection and then compensating data sets accordingly so that different first and second images can be aligned. Consistent with this understanding of the present invention, claim 1 requires, among other things, first and second imaging configurations that define first and second imaging areas along a translation axis and that generate first and second imaging data sets, a sensor for sensing the position of at least one table segment as the table is extended from a support and into an imaging area, a determiner for determining the relative position of at least one of a first imaging detector and a second imaging detector with respect to the table and a compensator that modifies at least one of first and second data sets as a function of the relative position information prior to combining the information sets to form a unified image.

Thus, the function of the present invention is to compensate for table deflection or sagging and the function is accomplished by determining the degree of sagging and compensating at least one of the first and second data sets as a function thereof.

With respect to function, Kosugi fails to even suggest that table deflection may be a concern and therefore cannot possibly teach compensating for table sagging. Instead, Kosugi is provided so that complex imaging sessions can be archived and repeated several times thereby generating images with system components in identical relative positions. To this end, to properly image certain

anatomical structure/functions, Kosugi recognizes that it is necessary to step an imaging system through several different configurations where images are generated with the system in each of the consecutive configurations.

For the purposes of illustration assume that due to the number of moving parts on a system the number of different configurations is essentially unlimited. In addition, assume that for a certain patient a radiologist wishes to generate images with the system in twenty different consecutive configurations. Moreover, assume that over the course of six months the radiologist wishes to repeat the complete imaging process once at the end of each month so that images that correspond to the same configurations can be compared and a history of images can be generated.

Kosugi provides a system wherein, during the first imaging session when the first set of images are generated, the system is controlled to identify system component/equipment positions and to store the position information in a sequence that includes information, in the present example, for each of the twenty configurations.

At the end of the next month when the radiologist wants to repeat the twenty position image generating series, the radiologist can rely on the system memory and automated control systems to step the session through each of the desired configurations to generate suitable images for comparison.

With respect to form, as recognized by the Examiner, Kosugi teaches nothing about first and second different imaging configurations that define first and second imaging areas along a translation axis. In addition, Kosugi fails to teach or suggest a compensator for modifying image data for alignment purposes. In fact, Kosugi teaches away from a system where images are aligned by a compensator by teaching that consecutive aligned images can be generated by mechanically aligning components prior to generating images (i.e., Kosugi contemplates a system that generates aligned image data sets initially and where compensation to align subsequent to data generation is not necessary). Thus, Kosugi is clearly different than the claim 1 invention in both form and function.

With respect to Nutt, while Nutt teaches a dual imaging system as recognized by the Examiner, Nutt fails to teach or suggest the other components required by claim 1 including a sensor for sensing misalignment of a table to detectors, a determiner for determining the relative position of a table to a detector and a compensator for altering one set of data as a function of the relative position information.

In fact, Nutt appears to assume a completely stiff patient support table. In this regard, Nutt teaches that functional and anatomical images are co-registered without the use of external markers (i.e., akin to determining the position of the table) or internal landmarks (see last sentence in Abstract). With respect to the dual CT-PET systems contemplated by Nutt where CT and PET imaging areas are aligned and adjacent each other, as in Kosugi, alignment is supposedly mechanically ensured by moving the table along a single axis through the consecutive imaging areas – here, alignment could only be assumed if the table is completely stiff.

Applicant also notes that there is no teaching in either of Nutt or Kosugi to combine with teachings of the other of the two references.

With respect to claim 12, claim 12 is a method claim that mirrors the limitations of claim 1 and therefore the discussion above is equally applicable to claim 12 and the Applicant believes claim 12 is patentable over the cited references.

With respect to each of claims 19 and 21, those claims are similar to claims 1 and 12 except that two sensors are required for sensing the positions of two parts of a support table with respect to the detectors. Thus, the discussion above with respect to claim 1 is applicable to each of claims 19 and 21. In addition, claim 19 requires that the two sensors measure the vertical positions of two separate table segments. The sections of Kosugi cited in the Office Action teach one sensor for vertical position and a second sensor for longitudinal position, not two sensors for vertical positions.

In addition, each of claims 19 and 21 requires that the determiner use signals from first and second sensors to determine the relative positions of each of

functional and static detectors with respect to a table during data acquisition. Again, Kosugi fails to teach two detectors and therefore cannot teach this limitation. For at least these additional reasons Applicant believes claims 19 and 21 are is patentable over the cited references. Similar comments are applicable to each of claims 5, 7, 14 and 16.

All of the other claims depend from one of claims 1, 12 or 19 and therefore are patentably through dependency.

Applicant has introduced no new matter in making the above amendments and antecedent basis exists in the specification and claims as originally filed for each amendment. In view of the above amendments and remarks, Applicant believes claims 1 – 21 of the present application recite patentable subject matter and allowance of the same is requested. No fee in addition to the fees already authorized in this and accompanying documentation is believed to be required to enter this amendment, however, if an additional fee is required, please charge Deposit Account No. 07-0845 in the amount of the fee.

Respectfully submitted,

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Date: 5-10-04

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